

**REMARKS**

Claims 34-38 are newly added by this amendment. Thus, Claims 1-3, 5-11, 13-18 and 20-38 are currently pending in this application, with Claims 1, 9, 17, 24, 30 and 31 being the only independent claims. Examiner Nguyen is thanked for withdrawing the final rejections of Claims 1-3, 5-11, 13-18 and 20-33.

However, now Claims 1-3, 5, 7-11, 13, 15-18, 20, 22-27 and 29-33 are rejected under 35 U.S.C. §103(a) in view of U.S. Patent No. 6,325,492 to *Koitabashi et al.* in view of U.S. Patent No. 6,106,093 to *Nagoshi et al.*

Claims 1, 9, 17, 24, 30 and 31 are generally directed to an ink jet printer. Among other features: Claim 1 defines an ink jet printer ejecting a plurality of kinds of ink droplets of different sizes from a single nozzle, the printer including a smoother for performing a smoothing process using a dot smaller than a dot forming the image wherein the smaller dot and the image forming dot are ejected from the single nozzle; Claim 9 defines ejecting a plurality of different kinds of ink droplets, including smoothing droplets and image forming droplets, from a single nozzle; Claim 17 defines that image forming droplets and smoothing droplets are ejected from a single nozzle; Claim 24 defines a nozzle for ejecting ink droplets of different sizes to form an image on a recording medium with image forming dots and smoothing dots; Claim 30 defines ejecting ink droplets of different sizes from the same nozzle so that smoothing dots are arranged around the edge of image forming dots; and Claim 31 defines at least one nozzle capable of ejecting ink droplets of different sizes to form image forming dots and smoothing dots, the ink jet head capable of ejecting from the at least one nozzle, ink droplets to form an image consisting of image forming dots and smoothing dots.

Further, Claims 1, 9, 17, 24, 30 and 31 generally define certain features directed to the positioning of a smoothing dot. For example: Claims 1 and 9 define the print center of the smaller sized dot being closer to a center of an image forming dot than the pitch of the image forming dots; Claim 17 defines controlling the timing of printing a smoothing dot; and Claims 24, 30 and 31 define that the distance between the center of a smoothing dot and an image forming dot is shorter than a distance between the centers of image forming dots.

As noted in two previous responses, *Koitabashi et al.* does not disclose ejecting smoothing droplets and image forming droplets as generally defined in Claims 1, 9, 17, 24, 30 and 31. In *Koitabashi et al.*, during smoothing some ejection openings eject image forming droplets, and other different ejection openings eject smoothing droplets that are positioned adjacent to the image forming droplets. See column 25, lines 46-55. *Koitabashi et al.* specifically states that the ink jet printer performs smoothing by ejecting image forming droplets and smoothing droplets from different nozzles. The Official Action acknowledges this deficiency and take the position that this deficiency is satisfied by *Nagoshi et al.*

*Nagoshi et al.* discloses an image processing method and apparatus having high-definition and low-definition printing. In low-definition printing large dots are ejected and the printing head moves quickly, while in high-definition printing smaller dots are ejected and the printing head moves slowly.

The Official Action seems to take the position that *Koitabashi et al.* only fails to disclose small and large dots ejected from the same nozzle. However, this statement is not entirely accurate, as *Koitabashi et al.* at least fails to disclose smoothing droplets and image forming droplets ejected from the same nozzle. The

Official Action concludes that if *Nagoshi et al.* shows ejecting small and large dots from the same nozzle that *Koitabashi et al.*'s deficiency is satisfied. This assumption is inherently illogical, because even if *Nagoshi et al.* does disclose large and small dots ejected from the same nozzle, neither reference discloses at least a smoothing dot and an image forming dot ejected from the same nozzle as defined in the claims. For at least this reason, it is requested that all the rejections be withdrawn.

### ***No Motivation to Combine***

It would not have been obvious and there would have been no motivation to modify *Koitabashi et al.*'s method and apparatus in view of *Nagoshi et al.*'s method and apparatus for the following reasons.

*Koitabashi et al.* clearly teaches away from ejecting smoothing dots and image forming dots from the same nozzle by showing that it is desirable to eject smoothing dots and image forming dots from different nozzles. At column 25, lines 51-55 (emphasis added), *Koitabashi et al.* specifically states that, "upon performing smoothing, it is desirable to make the dots to be formed in the smoothing mode by reducing the ejection amount to be ejected through the additional ejection openings than that set for the ejection openings to perform printing." Also, in column 25, lines 53-55 (emphasis added), *Koitabashi et al.* discloses "reducing the ejection amount to be ejected through the additional ejection openings than that set for the ejection openings to perform printing." Also, in column 25, lines 47-50 (emphasis added) *Koitabashi et al.* discloses performing "smoothing by employing the ejection openings other than the ejection openings used for printing in 360 DPI or 240 DPI, with respect to the dot data of 360 DPI or 240 DPI."

Therefore, *Koitabashi et al.* teaches away from ejecting smaller smoothing droplets and image forming droplets from the same nozzle. One skilled in the art would not have been directed to modify *Koitabashi et al.* to include a feature from *Nagoshi et al.* that was contemplated and dismissed as being undesirable.

It is also significant to note that *Nagoshi et al.* also teaches away from the modification proposed by the Examiner. At column 2, lines 52-61(emphasis added), *Nagoshi et al.* states “[a]lso, when ink droplets of different sizes are discharged from one and the same nozzle, disturbance takes place in the stability of an intended discharge if the ink droplets of different sizes are being discharged mixedly in one and the same scan.”

According to the Manual of Patent Examining Procedure, a proposed modification cannot render the prior art unsatisfactory for its intended purpose. See § 2143.01. Since both references discourage using the same nozzle for ejecting droplets of different sizes, the modification proposed by the Examiner would likely render the prior art unsatisfactory for its intended purpose. Further, the case law is clear that a prima facie case of obviousness can be rebutted if the applicant can show that the art in any material respect teaches away from the claimed invention. See *In re Haruna*, 249 F.3d 1327, 58 U.S.P.Q.2d 1517 (Fed. Cir. 2001).

### ***Claim Rejections***

The Official Action observes that *Koitabashi et al.* discloses every feature of Claims 1, 9, 17, 24, 30 and 31 except for small and large dots ejected from the same nozzle during a smoothing process and relies on *Nagoshi et al.* to disclose this feature.

The Examiner is reminded that the basic requirement for an obviousness rejection under 35 U.S.C. §103(a) requires that "the prior art reference (or references when combined) must teach or suggest all the claim limitations." See MPEP 2143. Here, as set forth in the Official Action, *Koitabashi et al.* discloses smoothing dots and image forming dots that are ejected from different nozzles and *Nagoshi et al.* discloses ejecting small (not necessarily smoothing dots) and large dots from the same nozzle. The Official Action takes the position that if small and large dots are ejected from the same nozzle, as allegedly disclosed in *Nagoshi et al.*, that it would have been obvious to modify *Koitabashi et al.* to eject small smoothing dots and image forming dots from the same nozzle. It is respectfully put forth that this combination is improper for the reasons set forth above and that both references continue to lack disclosure of the feature directed to ejecting smoothing dots and image forming dots from the same nozzle as generally defined in the claims. For at least this reason, the rejections of Claims 1, 9, 17, 24, 30 and 31 should be withdrawn.

### ***Claim 1***

Claim 1 is directed to an ink jet printer having, among other features, a smoother for performing a smoothing process using a dot smaller than an image forming dot, and a controller for printing the center of the smaller dot close to the image forming dot at a distance smaller than the pitch of the image forming dot.

*Koitabashi et al.* does not disclose an image forming dot and a smaller dot that is positioned closer to the image forming dot than the pitch of the image forming dots, the image forming dot and the smaller dot being ejected from the same nozzle.

As relied on in the Official Action, *Nagoshi et al.* discloses a small and a large dot ejected from the same nozzle, but does not disclose a small dot printed closer to an image forming dot and an image forming dot ejected from the same nozzle as defined together with the other features in Claim 1. For at least this reason, Claim 1 is allowable.

### ***Claim 9***

Claim 9 is directed to an ink jet printer having, among other features, smoothing droplets and image forming droplets ejected from a single nozzle, and a controller to change the position of the smoothing dots based on the size of the dot.

*Koitabashi et al.* does not disclose a smoothing droplet whose position is changed based on the size of the dot and an image forming droplet ejected from the same nozzle. As relied upon in the Official Action, *Nagoshi et al.* only discloses large and small dots ejected from the same nozzle. Therefore, neither reference discloses ejecting smoothing dots whose position is changed based on the size of the dot and an image forming dot ejected from the same nozzle as defined together with the other features in Claim 9. The disclosure in *Nagoshi et al.* that small and large image forming dots are ejected from the same nozzle does not remedy *Koitabashi et al.*'s deficiency with respect to the rejection of Claim 9. For at least this reason, Claim 9 is allowable.

Claim 9 is also allowable at least because it defines a controller for changing the distance between the centers of adjacent dots thereby changing the printing position of at least the smoothing dots based on the size of the dot in printing said plurality of kinds of dots. Neither *Koitabashi et al.* nor *Nagoshi et al.* disclose this

feature. As noted in the previous response, Figure 43 fails to disclose at least this feature together with the other features recited in Claim 9. Figure 43 merely shows dots of different sizes and positions, and does not disclose that a controller changes the distances between the centers of the adjacent dots based on the size of the dots. Further, in contrast to the Examiner's interpretation of Figure 43, the specification specifically discloses in column 26, lines 9-12, that "the interpolating dot data is determined depending upon presence and absence of the original dot data in the vertical and lateral directions and diagonal directions." Thus, *Koitabashi et al.* discloses positioning the dot based on the presence or absence of original dot data and not based on the size of the dot in the printing as recited in Claim 9. Also, though the Official Action did not rely on *Nagoshi et al.* to disclose such, *Nagoshi et al.* only discloses positioning dots on intersecting lattice points and does not change the distance between any of the dots.

#### ***Claim 17***

Claim 17 defines a method of controlling printing in an ink jet printer including, together with other features, ejecting image forming droplets and smoothing droplets from a single nozzle, and controlling the timing of printing the smoothing dot.

*Koitabashi et al.* does not disclose ejecting smoothing droplets and image forming droplets from the same nozzle. As relied on in the Official Action, *Nagoshi et al.* does not disclose ejecting smoothing droplets and image forming droplets from the same nozzle, but rather merely ejecting image forming droplets of different sizes from the same nozzle. Therefore, *Koitabashi et al.* in view of *Nagoshi et al.* still fails

to disclose at least ejecting smoothing droplets and image forming droplets from the same nozzle as defined together with the other features in Claim 17.

Claim 17 is also allowable at least because it defines that the necessity of positioning a smoothing dot is determined and the timing of printing the smoothing dot is controlled if it is determined necessary. *Koitabashi et al.* does not disclose this feature. Instead, in Figure 43, *Koitabashi et al.* shows a method of controlling printing in an inkjet printer which ejects a plurality of kinds of ink droplets of different sizes from a single nozzle, and determines whether or not control of the printing position of a dot is necessary in controlling the timing of printing the dot if it is determined necessary. As noted above, Figure 43 fails to disclose the step of determining whether or not control of the printing position of a dot is necessary and controlling the timing of the printing dot if it is determined necessary. The Examiner specifically references Figure 46b of *Koitabashi et al.* to disclose this feature, however, Figure 46b discloses setting "the timing for the large ejection amount mode by the initial setting." See column 27, lines 60-61. Thus, Figure 46b discloses initially setting the timing and size of the ejection, not determining if controlling the position of the dot and timing is necessary. Thus, Figures 43 and 46b do not disclose at least this feature together with the other features recited in Claim 17.

#### ***Claim 24***

Claim 24 is directed to an ink jet printer including a nozzle for ejecting image forming dots and smoothing dots, the smoothing dots being smaller than the image forming dots.



*Koitabashi et al.* does not disclose this feature and only discloses a nozzle for ejecting smoothing droplets and a separate nozzle for ejecting image forming droplets. Similarly, as relied on by the Official Action, *Nagoshi et al.* only discloses ejecting small and large image forming droplets from the same nozzle, not smoothing droplets and image forming droplets. Therefore, neither *Koitabashi et al.* nor *Nagoshi et al.* disclose a nozzle for ejecting image forming dots and smoothing dots. For at least this reason, Claim 24 is allowable.

### ***Claims 30 and 31***

Claim 30 defines a method of controlling printing in an ink jet printer including a nozzle for ejecting ink droplets of different sizes to form an image, performing a smoothing process to the image data, and ejecting ink droplets from the nozzle so that smoothing dots are arranged around the edges of the image forming dots. Claim 31 defines an ink jet printer having, among other features, an ink jet head capable of scanning on the recording medium while ejecting from at least one nozzle, ink droplets to form an image consisting of image forming dots and smoothing dots arranged around the image forming dots.

As noted earlier, *Koitabashi et al.* does not disclose ejecting smoothing droplets and image forming droplets from the same nozzle. As relied on in the Official Action, *Nagoshi et al.* only discloses ejecting small and large image forming droplets from a single nozzle. Therefore, even if *Nagoshi et al.* were combined with *Koitabashi et al.*, ejecting ink droplets from a nozzle so that smoothing dots are arranged around image forming dots as defined in Claims 30 and 31 would not result.

***Dependent Claims***

Claims 6, 14, 21 and 28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Koitabashi et al.* in view of *Nagoshi et al.* and further in view of U.S. Patent No. 5,980,015 to *Saruta*. The Official Action only relies on *Saruta* for a disclosure of a speed of ejection of an ink droplet being changed by changing the degree in signal voltage to print the dot. The deficiencies of the rejections of Claims 1, 9, 17 and 24, from which Claims 6, 14, 21 and 28 depend, are not overcome by *Saruta*. For at least this reason, Claims 6, 14, 21 and 28 are allowable.

The Official Action seems to take the position that *Koitabashi et al.* discloses all the features recited in Claims 2, 3, 5, 8, 10-11, 13, 15, 16, 20, 22, 23, 25-27, 29, 32 and 33. As these claims depend from allowable independent Claims 1, 9, 17, 24, 30 and 31 they are allowable for at least the reasons set forth earlier with regard to Claims 1, 9, 17, 24, 30 and 31.

***New Claims***

Claims 34-38 are generally directed to ejecting during a single scan. Specifically: Claim 34 defines that the smaller dot and the image forming dot are ejected from a single nozzle during a single scan; Claim 35 defines that the smoothing droplets and image forming droplets are ejected from the single nozzle during a single scan; Claim 36 defines that the plurality of kinds of ink droplets of different sizes including image forming droplets and smoothing droplets are ejected from the single nozzle during a single scan; Claim 37 defines a nozzle for ejecting ink droplets of different sizes during a single scan; and Claim 38 defines ejecting ink droplets of different sizes from the same nozzle during a single scan.

As noted earlier, the Official Action proposes that *Koitabashi et al.* does not disclose ejecting different sized droplets from the same nozzle, and that this deficiency is satisfied by *Nagoshi et al.*

Though this proposition is contested, Claims 34-38 are allowable at least because *Nagoshi et al.* does not disclose that droplets of different sizes are ejected from the same nozzle during the same scan. Column 16, line 51 through column 17, line 36 address the images shown in Fig. 11 (different sized dots ejected from the same nozzle during different scans). It is described that the main scanning direction corresponds to the forward (to the right) and backward (to the left) direction along the horizontal lattice marks, and that the sub-scanning direction corresponds to the vertical direction along the vertical lattice marks. The low resolution dots d1 are ejected during the scan in the forward direction, while the smaller dots d4 are ejected during the scan in the backward direction. See column 17, lines 2-7. Further, at column 17, lines 21-25 (emphasis added) it is stated that "dots d1 are recorded with scanning in the forward direction by large ink droplets in low resolution. Then, without feeding the recording medium, dots d4 are recorded in high resolution by the recording head 1 still positioned at (a) while scanning in the backward direction."

Further, as noted earlier, *Nagoshi et al.* teaches away from ejecting different sized dots from the same nozzle during the same scan. See column 2, lines 52-56 (emphasis added) where it is stated that "when ink droplets of different sizes are discharged from one and the same nozzle, disturbances [take] place in the stability of an intended discharge if the ink droplets of different sizes are being discharged mixedly in one and the same scan." Thus, one skilled in the art would have been directed away from the claimed invention.

**Conclusion**

In summary, there would have been no motivation to modify *Koitabashi et al.*'s method and apparatus in view of *Nagoshi et al.*'s because *Koitabashi et al.* and *Nagoshi et al.* teach away from such configuration, and because no benefit from the combination would have been apparent to one skilled in the art. Further, neither *Koitabashi et al.* nor *Nagoshi et al.* disclose ejecting smoothing droplets and image forming droplets from the same nozzle as defined by the claims. *Nagoshi et al.* does not even disclose ejecting smoothing droplets as defined in the claimed embodiments of the invention, or ejecting them from the same nozzle as image forming droplets.

Therefore, for at least the reasons stated above, it is requested that all the rejections of the claims be withdrawn and that this application be allowed in a timely manner.

In the event that there are any questions concerning this response, or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution of the application may be expedited.

Respectfully submitted,

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